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NEW YORK SUGAR MARKET.

From Willett & Gray's Circular.

The raw sugar market has held extremely firm throughout the week under very light offerings. Receipts have run down to 15,939 tons, against requirements for melting of 30,000 tons, and stocks have been correspondingly decreased, showing 27,251 tons decrease for last two weeks. Notwithstanding, the Cuba crop is now well under way, with 32 Centrals grinding, there are as yet few Cuban sugars on the market for sale, the planters evidently still having hope that Congress may do something at this session towards reducing the duties on their sugars, but intense opposition is already developing against even the admission of sugars from Porto Rico and the Philippines free of duty, and there will be even greater opposition arrayed against reduced duties on Cuba sugars. The domestic cane and beet sugar industry is against any concessions in this direction, and the fight over this question in Congress promises to be extremely severe and prolonged.

There has been a very fair demand for refined sugar during most of the week, followed by a period of dullness. Unusual activity has been noted for several weeks past, and buyers generally have fully supplied their wants.

European markets have been strong and advancing during most of the week, under the stimulus of a large demand from America. Beet sugars advanced 3d. to 9s. 7½d., closing at the highest. Cane sugars were not particularly affected on the London market, having remained steady, while beet sugars have advanced 7½d., and the purchases of beet sugar for America were at a cost not exceeding the parity of 4¼c. per lb. for centrifugals here.

It is possible that there is some anticipation of interruption of receipts of sugar from the Sandwich Islands on account of the outbreak of the bubonic plague in the Chinese quarters of Honolulu. We learn by wire of 22 deaths thus far in that city. The Hawaiian Gazette, received this week, gives report of extraordinary efforts making by the Government to limit the plague to the Chinese district, Chinatown being entirely surrounded with a guard of Government soldiers. Late arrivals at San Francisco of sugar from Honolulu have been detained in quarantine and fumigated before landing. Shipments of Sandwich Islands sugars could be effected from three ports other than Honolulu and as there is no evidence of the plague at those places, shippers may avoid Honolulu and forward their sugars from the other ports. With this plague now in Australia, Manila, Brazil and the Hawaiian Islands there is some danger, to say the least, of it obtaining a foothold here sooner or later. Very large purchases of raw sugars have been made by our refiners in Europe the past week, which will come in opportunely if any interruption of receipts comes from other countries. The position of sugar is very strong and we recommend the carrying of a full line of stocks.

Sugar War Still On.—The rumor mongers and their friends who have been such persistent publishers and believers in settlements, arrangements, combinations, etc., among refiners received a rude awakening at the annual meeting of the American Sugar Refining Co., when the statements of the President were made to the stockholders. The stock which at the opening of the meeting was at $130, dropped to 113½ before the close of the meeting. It is quite certain that the days of 12 per cent dividends in this stock have passed forever. The capacity of the independents is now so great, and the increase of the beet sugar industry so rapid, that such a dividend again has become impracticable and the stockholders may congratulate themselves that the able management of the Company has continued the rate at 12 per cent so long as they have. It is equally certain that the sugar war will become more severe in the future than in the past year, the decimal system of selling making closer cuttings possible.

Investors will transfer their holdings into sugar preferred,

and a larger volume of sugar common on the market will make it more speculative than ever and on a lower level.

The latest advices regarding sugar were that the New York Market was reduced to a small supply of raws, and orders had been sent to Europe to purchase beet sugar. The quotation was 4 7-16, and likely to advance to 4½ cents for Cuban centrifugals.

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To the annual report of the sugar trade statisticians, Messrs. Willett & Gray, we are indebted for the following statement relative to last year's movement of sugar.

The total consumption reached 2,094,610 tons—an increase of 4.57 per cent over 1898. It represents a per capita use of sugar of 61.7 pounds, against 60.3 pounds in 1898. The figures for eighteen years show an average annual increase in consumption of 6.11 per cent per annum.

The American Sugar Refining Company manufactured 1,385,608 tons, or 67.9 per cent of the total; the independent refiners, 585,765 tons, or 28.7 per cent; the beet sugar factories making refined sugar, 63,368 tons, or 3.1 per cent; and the foreign refiners, 5,935 tons, or .3 per cent. The difference between raw and refined sugar averaged one-half cent per pound, against .73 cent in 1898. The sugar war has been relentless, and is likely to continue so until the strongest party wins what it desires.

During the year the domestic beet sugar industry has made the greatest progress of any one year, and shows a production of about 95,000 tons in 1899, against only 32,471 tons in 1898, and 40,390 tons in 1897. This almost threefold increase is due to the operation of fifteen new factories, which doubles the number of factories, making thirty now in operation, and with nearly three times the capacity of the previous year. The weather conditions of the season were, unfortunately, against the industry in almost every section, and where this was not the case, the scarcity of labor and inexperience caused heavy deficits. With the better education of the farmers, the prompt opening of the campaign, and the better management of details made possible by this year's experience, the next crop year promises to be one of fully as great increase in tons of sugar produced, if not in new enterprises started, and, with good weather conditions, should certainly see this important

industry placed on a solid foundation and well started towards taking its place as an important influence in the sugar world.—Am. Grocer.

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WITH OUR READERS.

In last month's issue we referred briefly to a report made by Prof. Hart of the Royal Botanic Gardens of Trinidad, in which he gave the results of his year's experiments with selected seedling canes. Since that date, we have received his report in full, which is printed in this issue, omitting numerous tables. It will be found exceedingly interesting to all engaged in the cane industry and its improvement. He says "the primary object of all the experiments is to secure varieties of cane giving higher returns than the older kinds; and it cannot, I think, be denied that we are fairly on the way to a successful issue, when we are able to publish a selection of nine varieties, showing a yield of over 20 per cent sucrose, three of which gave over 21 per cent and twenty-nine others showing a yield between 18 and 20 per cent." Our readers will be surprised at the minute details of his work, and the labor and care taken on his part with every step. He alludes to a new seedling from the old parent Bourbon cane, from which our Lahaina cane originated, and apparently very similar to our Lahaina, but richer than the old Bourbon of Trinidad. If this be so, the new variety may prove a valuable discovery for our cane fields.

—Another article of special interest to the planter is that taken from a Queensland paper, which portrays the methods in which sugar plantations there are conducted. No wonder that the average yield of sugar is only one and a half to two tons per acre. The need of reform in Queensland sugar estates is quite apparent, and probably Dr. Maxwell will be able to discover what is the matter at a glance.

—Those who maintain that the white man cannot labor in the tropics will do well to read the article on "The Yankee in Tropical Agriculture" in this number. It is a semi-official statement by the U. S. Agricultural Department. The experience of Yankees in Hawaii is a full confirmation of the statements made by Mr. Coville.

—Readers will find this number of the Planter full of inter-

esting information on various topics, including the sugar trade of the United States and other countries; the success with seedling canes in Trinidad; cane culture in Queensland; Crossman's review of the very demoralized coffee trade; London review of the cane sugar industry, the success attending the search after new and richer canes than the well-known Bourbon, the statement regarding the American sugar refining trade for 1899, and the unparalelled prosperity of the entire United States.

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RAPID OCEAN TRAVEL IN PROSPECT.

It will be gratifying news to all interested in comfortable ocean travel to learn that the building of the new vessels of the Oceanic Company is being pushed with all possible speed in the shipyards of Roach & Son, on the Delaware. The first of these fine vessels will be launched in June, to be followed a little later by the others, so that the new line will be in full operation before the close of the present year. They are to make a speed of sixteen or seventeen knots, or about five days between San Francisco and Honolulu, which will result in largely increasing the travel between the mainland and these islands.

In this connection it may be interesting to note the origin and rapid rise of steamship service on the Atlantic. In a recent address by Sir William White before the British Association, he stated the following facts: In 1840, the side wheel steamship Britannia of the Cunard Line, 207 feet long, 750 horsepower, maintained a sea speed of about 8½ knots on a coal consumption of 40 tons a day. Speed has been increased from 8½ to 22½ knots and the time of the voyage reduced to about 38 per cent of what it was in 1840. Steamers have more than trebled in length, about doubled in breadth, and increased tenfold in displacement. The engine power has been made forty times as great. The ratio of horsepower to the weight carried has increased fourfold. The rate of coal consumption (measured by horsepower per hour) is now only one-third of what it was in 1840. In 1871, the White Star liner Oceanic, 420 feet long, 7,200 tons displacement, with engines of 3,000 horsepower, had a speed of 14½ knots. In 1889 the Teutonic, of the same line, was built, having a length of 565 feet, 16,000

tons displacement, 17,000 indicated horsepower, 20 knots' speed, and coal consumption of 300 tons a day; then followed, in 1894, the Cunarder Campania, 600 feet long, 20,000 tons displacement, 28,000 horsepower, at full speed of 22 knots, coal consumption 500 tons a day; and in 1899 the new Oceanic of the White Star Line, 685 feet, 25,000 tons, and a speed of about 22 knots. The Kaiser Wilhelm der Grosse, of the North German Lloyd Line, is 625 feet long and has maintained a speed of 22½ knots. A larger steamer is now building, the Deutschland, 660 feet, 23,000 tons, 33,000 horsepower, with an estimated speed of 23½ knots. Sir William is confident that the maximum of size and speed has not been reached, and says that "increase in length and weight favors the better maintenance of speed at sea. The tendency, therefore, will be to even greater regularity of service than at present. Quicker passages will, to some extent, diminish risks."

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"Reverting again to the Sandwich Islands and in further explanation of their success, says a Queensland paper, we find that science and practice go hand in hand, life and energy on every side—no six months of incubation as in Queensland—run on a well defined comprehensive system, and with capital ungrudgingly laid out to assist and encourage every effort to advance. These islands unlike this colony, but like every other sugar growing colony, are capitalized, in part, by absentee proprietors. Estates are managed by well paid specially-trained practical men, and the merit of their management is as it should be, judged on the financial results obtained each year, upon which entirely rests their reputation as managers and future engagements. * * * What the Colonial Company have done for manufacture, they can also do for the cultivation, and it is from them to seek advice and aid; instead of going to 'the land that sits in the sea' as the Sandwich Islands are somewhat facetiously called by an enthusiastic admirer and prominent mover in the scheme mentioned.

A Queensland correspondent, who visited the New South Wales sugar districts, reports the following regulations of the Colonial Sugar Refining Company as in force:

"On the Clarence river the Colonial Company has issued a manifesto to cane contractors, stating that the following va-

rieties of cane have been approved, and may be planted during the ensuing season: Striped Tanna, Green Tanna, Moore's Purple, Rappoe, Mauritius Ribbon, Induria, Black Java, and Light Purple. Other canes amongst which may be named the China, Purple St. Louis, Bamboo Rayee, Louzier, Batse, Purple, Black Isaacs, Black Cane, Stripped Isaacs, and Oiva may be planted in certain portions of the district; but before making arrangements, farmers should obtain the consent of the Company's cane inspector. The Company draws particular attention to the necessity there is of exercising every possible care when selecting cuttings to see that they are free from the gum disease. It is also recommended that as far as possible cuttings be taken from ratoons that have hitherto shown no signs of disease."

"A vote was taken by the Company of all cane contractors as to whether the latter would prefer to be paid per average density or by individual analysis. Of 302 votes recorded, 252 were in favor of the former. The price the Company will, therefore pay is 10s. per ton in the field, and if the cane is worth it, a bonus will be paid at the close of the season."

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BOUCHEREAU'S LOUISIANA SUGAR REPORT.

By the last mail we received a copy of Bouchereau's annual report of the sugar industry in Louisiana, and incidentally statistics of the sugar trade of the United States. This annual gives a vast amount of information relative to sugar, both as regards Louisiana and the United States, with tables of imports, exports, consumption of sugar in America and Europe for the past twenty years, making it a very valuable reference book. It also gives the names and address of all the sugar estates and owners in Louisiana, with the crop of each in pounds, and many interesting data relative to them, and to the efforts now being made to establish central factories, to grind the cane now raised by several thousand individual farmers, some of whom are provided with small mills, which are incapable of securing the sugar which the large centrals obtain.

This volume contains a strong argument from Dr. Stubbs in favor of the new system, and the reasons which he gives are supported by facts which must convince the small cane-

growers that it is for their interest to adopt the central factory system, which insures to them the largest net returns from their small crops that it is possible for them to secure, even after paying for transportation of their cane by rail or water. There are several hundreds of these small planters most of them without mills, and others with very poor and out-of-date mills. Transportation by rail is now so easily obtained that there can be no good reason why all the cane may not be ground at the central factories.

We insert a portion of Dr. Stubbs' address, in which he presents the matter in a light which ought to carry conviction, and lead to a change, which would result in a large increase in Louisiana's annual sugar crop. The Doctor says:

"The parting of the ways—the separation of the planting from the manufacturing of cane, has been of such recent occurrence that neither side of the industry may be considered as permanently established independent of the other. Central factories of large capacity, built with the purpose of buying all their cane, are the outgrowth of recent years, and are not yet permanently established. Insuperable obstacles have been encountered in (1st) obtaining the desired quantity of cane, and (2nd) in having this quantity well distributed through the grinding season. Several factories have been forced to buy land and cultivate on their own account large areas of cane to insure in some instances a sufficiency, and in others to control a constant supply to the mill when bad weather, railroad detention or local obstacles prevented daily delivery from numerous patrons. The result is that there are only a few real central factories in the State.

"While hundreds of large sugar houses buy cane from outside growers, yet the bulk of the cane manufactured is yet grown upon the grounds and at the expense of the factory.

"Enormous sugar houses with the latest improved equipments have been and will, we trust, continue to be erected in this State. The aggregate costs run high up into millions of dollars. They should be fostered and supported by a voluntary concession of enough profit to insure both a fair interest upon investment and a sufficient sinking fund annually to keep in thorough repair and of latest improvements, all of their machinery. To insure such a profit, cane in large quan-

tities must be grown, either by the factories on their own account, or by individual planters for sale to the factories.

"The increasing custom in Louisiana of buying cane from the small planters confirms the opinion elsewhere entertained, that central factories, supported by numerous small planters, contributed more to the distribution of wealth in a community than when the planting and manufacturing interests were concentrated into one vast estate. Numerous small planters would therefore appear essential to the highest developments of our sugar interests, and every manufacturer should encourage an increase in their numbers by conceding to them such profit that neither the vicissitudes of seasons, occasional floods nor the unreliability of labor, shall drive them from their chosen pursuit. The grower of cane, by all means, should be encouraged and protected. The mutual independence of grower and manufacturer is well recognized in all beet sugar countries. You cannot afflict the one without suffering from the other, and the destruction of either carries with it the life of the other.

"Let us compare values:

"A modern up-to-date sugar house capable of handling from 50,000 to 200,000 tons of cane per season, will cost from $100,000 to $500,000. After the actual cost of manufacture is paid, there should remain at least 10 per cent upon investment to cover insurance, taxes and interest, and 10 to 15 per cent as a sinking fund for repairs, replacements and betterments. To supply sugar houses there will be required 2,500 to 10,000 acres of cane, yielding 20 tons per acre. Add to the above a quantity of land sufficient for seed cane, corn and peas for stock, rotation, pastures, gardens, yards, etc., and there will be required at least 3,500 to 14,000 acres of cleared arable land. The swamp land, usually accompanying cleared land every where in South Louisiana, will bring the grand total up to probably 5,000 to 20,000 acres. To the land must be added the cost of dwellings, cabins, barns, stables, mules, horses, wagons, and implements. The aggregate value of all these are or should be equal to that of the factory purchasing the cane. It is fair then to assume that the capital invested by the growers and manufacturers is about equal. Establishing this fact, the cost of growing cane should be compared with the

cost of manufacturing into sugar, before an equitable division of profits can be determined."

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GREEN MANURING WITH LUPINS.

The short but admirable report of Mr. Lydgate of Hawaii on Fertilization, published in the Planter for December last, is conceded as furnishing the best, the cheapest, and the most feasible solution of this much-debated question that has been proposed for providing a remedy for worn-out sugar cane lands. The pith of his report is contained in this extract:

"Green-soiling, in my opinion, is perhaps the nearest we can come to occupying nature's methods of creating plant food that is at once available. * * * We have practiced green soiling for several years, and have derived great benefit from it. The only plant that is used for this purpose is the lupin; this planted in the beginning of winter grows in four months to a height of three to four feet, covering the field with a heavy growth. At first considerable difficulty was experienced in plowing this under because of the size of the plants and the immense amount of foliage; this has been overcome by the use of the "Secretary disc plow," which cuts them clean and turns them completely under, at the same time doing an excellent job of plowing and harrowing combined."

The same subject of lupins is referred in Dr. Hartmann's article, published in the January number of this year.

By a recent mail we received from the Agricultural station of the University of California, of which Dr. Hilgard is director, a parcel containing several pamphlets relative to lupins and other plants, which are considered as beneficial for fertilizers. This parcel may have been sent down specially after reading Mr. Lydgate's report referred to above; at all events, they are very acceptable at this time, when attention is being called to lupins and other fertilizing plants. The pamphlet referring to this plant is entitled "Lupins for Green Manuring, Bulletin 124." It gives a full history of the lupins, which are grown in Europe chiefly as a cattle-forage plant, and they have long been and are still considered there as among the best of green-manuring crops. There are several species of lupins, including the blue, pink, yellow, white, Egyptian and others, thirteen in all, some of which are not desirable to have on a farm. The "large blue lupins" are considered the best.

The University pamphlet says: "The legumes combine all the points required of a green manure plant—nitrogen-absorption from the air, deep-rooting, and at the proper stage of growth, that succulence which is conducive to quick decay, thus rendering the crop ingredients available at the earliest moment. Nevertheless, the plowing in of other green crops or weeds, when convenient, should not be neglected.

"It should be stated that the absorption of nitrogen from the air is conditioned upon the formation of excrescences or tubercles upon the roots, these being formed by the bacilli possessing that valuable faculty. When the soil is abundantly supplied with available nitrogen compounds, tubercles may fail to form; and such failure may also result from the absence of the proper bacilli, rendering necessary the innoculation of the land."

The pink and blue lupins are considered among the best for fertilizing purposes.

In Europe there are thirteen varieties of lupins, and in California there are ten, of which the large blue has been found the best. There the success or failure of these plants depends almost entirely on their seeds being sown to catch the first rains. When lupins have not been previously cultivated, it may be necessary to inoculate the soil by transfer of small quantities of the soil from localities where lupins have been growing. The necessity of this inoculation arises from the circumstance that the bacteria peculiar to the lupins do not make tubercles on plants of any other leguminous germs, and therefore are not found in soils where lupins have not grown. As to the method of planting, the custom in California is to use a beet-drill, which is the least expensive, as fifteen or twenty acres a day may be planted in this way. A beet cultivator is recommended for preparing the ground for planting.

There can be no doubt of the great value of this plant in restoring the fertility of some of our over-cropped cane lands, though perhaps not all of them would receive the same benefit. Just which fields need this treatment can only be ascertained by trial, taking first, perhaps, a small portion for an experiment. A few acres of a field planted with lupins, the remainder being treated with fertilizers in the usual way, would very soon show results which would determine their value. If

the experiment were tried on different fields at the same time, the results would be still more satisfactory. One great point gained, if the experiment prove successful, will be the saving in outlay for manures, which is now a very large item of expense.

The pamphlet referred to—(Bulletin 124) contains much information regarding this plant, and should any one desire the particulars, it can be obtained by writing a few lines to Prof. Hilgard, director of the Agricultural Experiment Station, Berkeley University, California. The seeds may probably be procured from any seedsman in San Francisco.

Referring to the subject, the Florida Agriculturist remarks:

The advantages of green manuring seem to be underestimated by the majority of farmers. When leguminous crops are used the following objects are gained: The physical properties of the soil are improved, the content of humus is increased, and consequently the soil plant-food is brought from lower to higher levels, and the most expensive plant-food—nitrogen—is not merely procured from the air, but is added to the soil when the plants decay. When given a dressing of potash and phosphate these crops are especially valuable for renovating worn and barren soils, and upon better land, combining with rational soiling, they furnish large quantities of stock food, thus permitting of a larger number of animals being kept and of a considerable saving of manure. If used as catch-crops, they prevent leaching and protect the soil from washing in times of heavy rainfall.

A recent writer on this subject well says:—"The agriculturist must not ask his land to give him crops year by year, without rendering to it a return for its bounty. If you want your soil to be liberal, you must make it "fat." The farmer, in his dealings with his fertile lands, cannot always be simply beneficiary; he must all the while be a benefactor also. The product of the soil must in some measure be returned to the soil if its fruitfulness is to continue. There are farmers who "skin" their land by constant cropping and no fertilizing; but it is ruinous economy for the owner and a grave wrong to the community; for whoever reduces the wealth of the nation's soil and the sources of the supply of sustenance is guilty of unsocial conduct."

ROCKEFELLER ON TRUSTS.

The President of the Standard Oil Company, in his testimony presented to the Industrial Commission at Washington, D. C., declares that industrial combinations are absolutely necessary; favors National control, or, if that is not feasible, State legislation as nearly uniform as possible.

In reply to a question as to what are the chief advantages from industrial combinations, Mr. Rockefeller said:

"All the advantages which can be derived from co-operation of persons and aggregation of capital. Much that one man cannot do alone two can do together, and once we admit the fact that co-operation—or, what is the same thing, combination—is necessary on a small scale, the limit depends solely upon the necessities of business. Two persons in partnership may be a sufficiently large combination for a small business, but if the business grows, or can be made to grow, more persons and more capital must be taken in.

"The business may grow so large that a partnership ceases to be a proper instrumentality for its purposes, and then a corporation becomes a necessity. In most countries, as in England, this form of industrial combination is sufficient for a business coextensive with the parent country, but it is not so in this country. Our federal form of government, making every corporation created by a State foreign to every other State, renders it necessary for persons doing business through corporate agency to organize corporations in some or many of the different States in which their business is located. Instead of doing business through the agency of one corporation, they must do business through the agencies of several corporations."

In reply to the question as to what he ascribed the success of the Standard Oil Company, Mr. Rockefeller said:

"I ascribe the success to the company's consistent policy to make the volume of its business large through the merits and cheapness of its products. It has spared no expense in finding and utilizing the best and cheapest methods of manufacture. It has sought for the best superintendents and workmen, and paid the best wages. It has not hesitated to sacrifice old machinery and old plants for new and better ones. It has placed its manufactories at the points where they could sup-

ply markets at the least expense. It has not only sought markets for its principal products, but for all possible by-products, sparing no expense in introducing them to the public.

"The Standard Oil Company has not hesitated to invest millions of dollars in methods for cheapening the gathering and distribution of oils by pipe lines, special cars, tank steamers, and tank wagons. It has erected tank stations at every important railroad station to cheapen the storage and delivery of its products. It has spared no expense in forcing its products into the markets of the world, among people civilized and uncivilized. It has had faith in American oil, and has brought together millions of money for the purpose of making it what it is, and holding its markets against the competition of Russia and all the many countries which are producers of oil and competitors against American oil."

Much in the same line would be the reply of the successful individual worker if asked the secret of success, especially the retail grocer. "I work hard, as intelligently as I know how, endeavor to keep up with the latest devices, most modern methods, and try to make the service I render a little better than that of most of my competitors. I never deceive people, I buy as closely as possible for cash, carefully supervise credits, secure experienced helpers, avoid waste, keep insured, buy in the best markets, push for trade, advertise, read a good trade journal, never worry about what others are doing; in short, I concentrate my energy on my business."

It is difficult to understand why it is a wrong to society for a combination of individuals or aggregation of capital to adopt the same policy as that put into play by the individual. —Am. Grocer.

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FOREST TREES KILLED BY INSECTS.

Makawao, Maui, Feb. 3, 1900.

Editor Planters' Monthly. Sir:—Having been requested by a prominent cane planter to write my views on the destruction of forests in the Hawaiian Islands, I will endeavor to do so as clearly as possible.

I first noticed the Koa trees at Kaonoulu, Kula, Maui, in the latter part of 1879, whole groves of sturdy trees seemingly smitten as with some terrible scourge or frost, that had de-

nuded them of every leaf. Being a stranger to the country I asked the then owner of the place, Mr. D. P. Eldredge, what was the reason of it, and he said, to the best of my recollection, that he did not know.

When I took up my abode in Kula some few years later, (1884) I was again brought in contact with the same thing. I had looked over the land some months prior to buying it, and noticed with pleasure the beautiful groves of green Koa trees, so indispensable to the comfort and welfare of cattle.

When I came to occupy the place, I saw that some of the best and largest of the trees showed signs of decay, dying from the tips of the branches inwards, i. e., towards the trunk. On breaking off a branch that was blemished, I noticed little round holes in it, about the size that a No. 6 shot would make, and on following these holes up, would find a sort of grub, or borer, of whitish body, and blackey-brown head, the head being furnished with a very strong and useful pair of pincers.

These borers work their way inside the branches towards the trunk of the tree, and as they go, they seem to kill the branch they are occupying as a place of residence. Some branches are green and healthy for half their length, and the other half towards the extremity, is dead, and on examination will be found riddled by borers.

How the borer originally gets on the branch I can not tell; I have never seen any outside of the bark, so presume that they are hatched in crevices, from the eggs of flying ants, or some kind of moth, and as soon as they are strong enough, bore their way into the tender parts of the branches. These borers, if left alone, will in a few months destroy the largest tree; and the tree always dies the same way,—from the tips of the branch inwards. I have also found this same borer in the Mamane, Naio, and Olapa trees, but never in the Ohia.

You may now at this stage ask, what do you propose to do, to prevent these borers from utterly destroying our forests? Well, I firmly believe that if either the Government, or some philanthropic person, or persons, were to import woodpeckers, and other birds, that prey on this special species of nuisance, and turn them loose on the various islands, it would very materially assist in the preservation of our most beautiful and valuable woods. I should at the same time advise that due inquiries be made as to the habits, etc., of the birds to be im-

ported, in case they might possess some trick that would entirely invalidate their usefulness.

If you take one of the trees that has been attacked by the grub, bore a hole in it with, say an inch auger, put a teaspoonful of powdered calomel in the hole and plug it up, you will find that all signs of decay will stop in a very short time, but whether this effect will be permanent I cannot yet say. I do know, however, of one tree that was half dead three years ago, being operated on as above, which is now growing quite well, that is, the part that was alive when doctored, has now developed into a fairly decent tree, the part that was dead is still dead.

This treatment, of course, could not very easily be applied to forests; but for persons who are fond of native trees round their houses, it would be worth their while to give it a trial. The borer does not trouble the trees till they are about two years old or more.

To give an instance of what can be done in the way of the preservation and renewal of forests: About four years ago, a portion of forest land on Maui was fenced up securely, the tame cattle driven out, and those that couldn't be driven, and also the wild ones shot. Now, in places where formerly one could ride through fairly well, it is hard work to get through on foot; and the place is full of young Ohia, Koa, Mamane and other native trees, looking healthy and well. But, unless something is done to protect them from their enemies other than cattle, I am afraid they will, as they get along in years, be discovered by the borer, with the inevitable prospect of death staring them in the face.

It seems to me that it would be worth while for the Planters, if the Government won't do anything, to find out from the United States what sort or sorts of birds would be best to import to combat this pest. There are, to the best of my knowledge, several birds that live on nothing else but insects and grubs that they peck out of the trees, and these, if they have no other occupation that might be to their detriment in the Islands, are the sort we ought to import.

Trusting that my remarks may be of some use to the Island public.

Yours sincerely,

L. VON TEMPSKY.

SEEDLING CANES.—TRINIDAD.

The following report on the seedling cane experiments, season of 1898-9, has been issued by Mr. J. H. Hart, F. L. S. Superintendent of the Royal Botanic Gardens, Trinidad, of the Botanical Department, Trinidad, and dated 4th October, 1898. The time covered by the report is from 1st June, 1898, to 30th May, 1899.

The crop harvested in April and May, 1899, is the first which has been reaped from the new experiment ground, St. Clair.

The results show a decided improvement over the returns obtained in the shaded and worn-out soil in which the experiments were commenced and conducted for four previous years.

The experiments previous to 1899 were carried on solely by the Botanical Department, but early in the present year, at the suggestion of the Director of the Royal Gardens, Kew, His Excellency Sir H. E. H. Jerningham directed that the analyses for publication should be carried out by the Government analyst, and that officer has issued a special report on the results arrived at by the analysis of the cane samples in 1896.

Previous work in the old garden is not directly comparable with the results obtained at the Experiment Station, as the conditions are very different; neither is it comparable with the results obtained on estates. This fact, however, does not in the least affect the value of the experiments, as will be shown later.

Estates grow their crops so that the canes when cut are 15 months to 17 months old; while, under the system we are compelled to adopt, our crop is reaped at regular intervals of 12 months, and, therefore, any conclusions based upon comparisons of the two results would be erroneous.

The only way in which comparisons can be made between the growth on our own plots and those produced on estates is by allowing them a "relative value" determined by the growth of well-known standard varieties, as indicated in my last annual report. The standard varieties used must be grown on the same ground as those under trial, and receive the same treatment, and the difference of value thus ascertained must then be compared with the recognized "estates value" of the

old standard varieties, to ascertain the true value of any given seedling variety.

The cutting of the canes commenced on 20th April, and ended on the 19th of May, and the rainfall during that period was 0.30 of an inch.

A difference appears between the values of the Demerara canes and the seedlings cut during the last days of the crop. This is to be accounted for by the fact that unlike conditions existed. It is not to be expected that seedlings which have 18 months growth from the seed can be compared with plants grown from cuttings at 12 months old, especially when the seedlings have stood, as several of ours did, in isolated positions conducive to ripening.

In my annual report for 1898, I called attention to the fact that some canes only ripen at 15 months, while others are mature at 12 months or earlier. Of the former class is D 61, and T 1 and T 2. Of the other class are D 95, D 74, and others. D 61 is not more than three-quarters grown at 12 months old from cuttings, while D 74 will arrow freely in nine or ten months. When they are grown on estates the planter will have to take these features into account in ascertaining the value of the varieties.

The situation at St. Clair, though an immense improvement over the old grounds, where the experiments were first initiated, cannot be considered as first-class cane soil. Consequently the value of the crops grown must still be judged by comparison with the growth of standard varieties, and it will be seen that we have in cultivation the Bourbon and Caledonian Queen especially for this purpose.

It is probable that the fact of the soil at the Station, being somewhat inferior, will be of considerable advantage to us in the conduct of experiments, for if it were richer, the experiments would be open to the objection that they had been conducted under exceptional circumstances, while it is certain that if canes do well on a poor soil, they may be expected to do better on a fertile one.

It is clear that effective tests of the new canes should be carried out on large sugar estates, under the ordinary conditions, at the earliest possible moment. It is quite as clear, when looking at the matter from an economic point of view, that planters cannot be asked to try canes which might land

them in serious loss; and, therefore, it is imperative to conduct the experiments, as experiments, without limit of time, until the cultivator has no doubt as to the result when grown on large areas. A familiar instance of going too fast has been illustrated in Trinidad by the trial of the Burke cane. It produced large crops, but was wanting in sugar contents, did not mill well, and the megrass had not substance enough to keep the furnace going, and coal had to be purchased to make up the deficiency.

Such unfortunate occurrences do more to retard the progress of the seedling cane experiments than can well be imagined, as they induce a distrust among planters of the newer kinds. It is necessary, therefore, to proceed with the utmost caution, following the excellent example set by Messrs. Jenman and Harrison, of Demerara.

It is patent, therefore, that while the seedlings should be put into the hands of the planters at the earliest possible moment, it is equally important that nothing but what is really good and well proved, for successive seasons, should be put into the hands of the planters.

Endeavours have been made to give yield per acre, but this is a somewhat difficult matter under the conditions existing on an experimental field. It is sometimes done by counting stools per acre; but with seedlings the characters are so various that it is hardly possible to give correct results by this method. For instance, a seedling may have such a habit as to require it being planted at six feet apart, while the next may admit of being planted at four feet apart, the inference from which is obvious.

As small cane thickly planted may yield as much or more than a strong cane planted widely, and who can yet say which is the best of the two, and most economical for the planter to grow? Even when small and exact areas are used, it is still doubtful if the yield of such a small area can be taken as giving the same results as would be attained when grown in a larger quantity, for it is easily seen that the conditions of the surroundings of such a small area would influence in no small degree the yield of canes. There is, however, no better method than small areas for testing yield, but they must be used with caution. The true yield of any cane cannot be ascertained until after several season's culture in the field, under normal conditions.

I have been often applied to for plants of canes shown by analysis to give a high sugar content, the applicants having omitted to note that this has (perforce) to be made, in the first instance, on canes from a single stool, and it is patent that a very wide distribution cannot be made from a single plant. Planters are, therefore, informed that no distribution can be made of the newer canes until they have been grown and tested for successive seasons. Our experiment field contains, however, plots of one-twentieth of an acre of the following kinds. D 95, D 74, D 76, D 115, D 116, and T 2, the whole of which are available to planters. But our seedlings, the oldest some four years old, cannot be offered without risk of loss to the planter and reputation to the raiser.

The Demerara varieties are thus represented by areas of one-twentieth of an acre each, and canes from these plots were distributed to seven different estates to the number of 17,700. In fact, ten times the quantity could have been distributed had the plants been available.

To prevent future mistakes or misconceptions, the method followed in conducting the experiments is now detailed.

In the first year of selection we work on one plant cane only, *i.e.*, one plant grown from seed selected from, perhaps, 500 others. For instance, the canes under Nos. 146 to 209 are this year represented by one plant only. After analysis the cane is cut up, the eight stools are planted, so that in the next year's examination there will be eight stools available for further propagation, if found, on analysis, that it is desirable to extend the cultivation of any particular number. At crop time next year, however, some of these may be so worthless in appearance that they will be condemned as unfit for further trial. Canes are never condemned except for good reasons; but it is evident that doubtful ones cannot be retained, while there is a due proportion which can successfully pass the field test. It is all very well that they may prove the better in a succeeding year, but it must also be said that having once failed they may fail again, and time cannot be wasted in trying *failures* a second time.

It will be seen, therefore, why numbers fall out, even after they have given a high sugar yield in a previous season, for in the race for priority only those which show hardiness and

vitality, little affected by climate, season, or soil, will be selected as worthy of cultivation.

Therefore, we have—

First year, one stool.
Second year, eight stools.
Third year, the eight stools are ratooned.
Fourth year, if cane maintains its average, a plot of one-twentieth of an acre is planted, when for the first time the yield per acre can be fairly ascertained.
Fifth season, the canes can be distributed to planters.

To attempt to distribute canes at an earlier date would be to court failure. *Festina lente* is an excellent motto in conducting seedling cane experiments, and must not be disregarded.

The seedling plants (raised from seed Nov., 1897) are those which stood for a first examination in May last, in all numbering some 2,500. Out of this lot, for field reasons, 1,900 were condemned, 39 were examined, and some 500 "stood over," not being sufficiently advanced for analysis, as they were planted late.

There is no little difference between a plant from a seed, and a plant from a cutting or "top." The former takes some eighteen months from the seed, to the time for reaping; for instance from November, 1897, to May, 1899; but even after this length of time, it cannot be compared with plants grown from the "top" or "body canes," given the same time.

It will be seen, therefore, that it is a difficult matter to put an exact value on the results obtained by analysis of a first year's seedling. So much is this the case, that it is doubtful whether the first year's results should be taken for more than indications of promise taking the first registered value, from canes after they have been cultivated from cuttings, as on estates.

The cane which appeared first on the list last year has not this year given so high a return, and Cane T 77 has done much better. In the first case it was planted in poorer ground, and in the latter case in richer.

Attention has been directed to the growth of the Japanese cane, a variety received from Kew. It is a cane of weedy growth, but evidently possessing abundant vitality, and may possibly make a seed parent of some value. It analysed higher than the Burke cane, giving 15.67 per cent sucrose and 1.47 per cent glucose.

The analyses of the various samples examined, are included in this report as a Record of the work of the Botanical Department. Only those columns are reproduced however, which relate to the work of 1899, and the specific gravity has been deleted of the last two figures, the first four being sufficient for use in calculating "relative value." The tables are further necessary, as continuing the history of the work.

In carrying out the experiments, pains have been taken to note the maternal parent of the seedlings, and it has been found that seeds from seedlings, show a larger amount of variation, than seeds taken from standard varieties; a point which has been already noted and acknowledged by our fellow workers in Demerara, Messrs. Jenman & Harrison, and followed by them with equal success.

The seedlings (from seed of November, 1898) have grown well, but they have had to endure the most piercing drought experienced for many years, and some of them are backward and may not be ready for the examination of May, 1900.

The cuttings ("plants") taken from those tested for the first time this year, also met with great hardship from the same cause, and in one or two cases, not a cutting in the row survived, although regular waterings were given. This is somewhat unfortunate; as it will probably drop a few of the numbers from the next examination, but all of the best are alive.

Several of the beds of seedlings of 1897 were cut over, after making selections of plants for examination, and have been allowed to ratoon, with the view of ascertaining whether as ratoons any of the plants condemned would make a better show than as seedlings. From present appearances it is believed that the great majority were rightly condemned on the "first failure."

The sucrose percentage is one point with which the raiser has to deal, the percentage of juice is another, and yield per acre is third. These points have been well discussed in previous reports, and in Bulletin No. 20, other points have been added of nearly equal importance to the first three. In the article referred to, the yield per acre was placed at first among the standpoints of the cultivator and manufacturer.

1 Good cropper.
2 Upright grower (does not fall).
3 Sucrose yield.
4 High vitality.

5 Non-liability to disease.
6 Fair fibre in megass.
7 High percentage of juice.
8 Early maturity.
9 Easily crushed (mills well).
10 Juice easily clarified.
11 Flinty rind.
12 Ratoons well.

All these points belong to the cultivator and manufacturer, and it will be seen that they cover the three dealt with by the chemist, in Nos. 1, 3 and 7.

It will be noted that all those mentioned are good qualities, but there are quite as many bad qualities which have to be considered; and besides this, there are the elements of *chance*, *choice* and *prejudice*, all of which have an important bearing in carrying out experiments in raising new strains of plants.

It is hardly necessary to repeat that the primary object of all the experiments is to secure varieties of cane giving higher returns than the older kinds; and it cannot, I think, be denied that we are fairly on the way to a successful issue, when we are able to publish a selection of nine varieties, showing a yield of over 20 per cent sucrose, three of which gave over 21 per cent and twenty-nine others showing a yield between 18 and 20 per cent.

Taking in the manner usually followed by planters in estimating value, ninety varieties of seedlings were examined, of which we find 28 canes giving more than 2 lbs per gallon, and one giving as high as 2.34 lbs per gallon, or 21.41 per cent of sucrose.

Looking to the origin of the selected seedlings as shown in the column added for the purpose, the following parentage is found: Seventeen (17) from D 170; Twelve (12) from D 95; Twenty-six (26) from D 102; Six (6) from D 102; Three (3) from D 80; Five (5) from D 74; Six (6) from D 116; Four (4) from D 115; One (1) from Bourbon; Four (4) from Demerara seed; One (1) from Naga B.; Four (4) from Barbadoes seed; Two (2) from D 109; and One (1) from T 2.

From these statistics, it is seen that D 102 has 11 varieties, D 170 has 7 varieties, D 59 has 5 varieties, and D 74 one variety, giving over 20 per cent yield of sucrose. From this it might be inferred that D 102 was the best cane parent, but this is by no means the case; for the fact is, that there were

more seedlings raised of that parent, and evidently a greater chance of it producing good seedlings. D 102, the parent, has been this year condemned, on account of its liability to disease, and poor yield, after a trial of four years.

Some of the canes showing a yield below 20 per cent may prove better canes for planters than those showing higher results. This will probably be due to the fact of their not being ripe at the time of examination, and, therefore, unequally matched against an earlier ripening variety. It is imperative, therefore, before finally rejecting a cane to grow it and test it on the plan of 15 months growth, as is done on estates, or at least to consider its age, before comparing it with other growths.

It should be noted that all the older varieties, are of Demerara origin, and since they were raised, others have been produced which are said to take precedence of any previously raised in the colony. I am glad to be able to record that estate experiments with No. 95 have proved that cane at least equal, if not superior, to the Bourbon. Some acres having been grown at Brechin Castle by Mr. Greig, and the results carefully tabulated by a properly qualified chemist.

Mr. J. R. Bovell very kindly sent me in December, 1898, six canes raised in Barbadoes, B 147, B 156, B 208, B 254, B 306, and B 347. Of these No. 147 shows a great want of vitality, while No. B 156 has shown itself to be a good dry weather cane. We also received from Mr. G. S. Jenman, of the Botanic Gardens, Demerara, three of his varieties, represented by Nos. D 625, D 711, and 721. One of these is a very fine yellow cane. These will stand for examination in May next. In return we have sent Mr. Bovell some cuttings of our best seedlings for trial, namely, Nos. T 87, T 100, T 19, T 21, T 24, T 30, T 39, and T 77. Therefore, Mr. Bovell has plants of the richest canes examined this year, and one with the highest amount of glucose. It will be very interesting to note how these canes answer in Barbados. Nos. T 77, and T 87, both showed over 21 per cent of sucrose in this year's trials, while T 100 showed 4.97 per cent of glucose, and 11.47 per cent of sucrose.

With regard to disease, there is little to report. The cane fungus was present, but did little or no damage as the season was not one favourable to its spread. The moth borer did some slight damage early in the season, but *Coccidcoe* were conspicuous by their absence.

I respectfully submit that the experiments have made satisfactory progress, and that the data now ascertained give promise of further success.

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DISEASED CANE AND GUMMING IN QUEENSLAND.

That the sugar industry in Queensland is in a bad way is evident from the published annual returns of the small yield of sugar per acre for several years past, which has varied from one and a half to nearly two tons per acre. The mills are said to be among the best that are made, and the farm as well as the factory work is carried on by men who have had long experience in the business. The main trouble seems to be in the cane itself, and it may be that the soil is of a character not suited to the plant, or that it needs irrigation. Still great efforts have been made to secure the best of seed cane from other countries, the result, so far, being still very unsatisfactory. A writer in the Queensland Sugar Journal, whom we take to be a planter, gives the following report of his troubles and experiences. The communication was evidently written before Dr. Maxwell's arrival:

Editor Sugar Journal:—This year again on every side we hear complaints of the trouble experienced in manipulating the juice, caused by diseased cane and gumming and the difficulties to the chemical staff and others to cope with it successfully. This is not an experience of today or yesterday, but one that has been going on for some years past and all efforts to eradicate it scientifically have failed. The general opinion arrived at by those best qualified to judge declares that the only absolute remedy is in the field, where by a change and more careful selection of seed for plants and a modern system of cultivation, success would be assured. Common sense must endorse this opinion and the important question of the extra cost of growing that would thereby follow is not so alarming if we consider the increased yield and the better quality of cane that would surely be the result. On the other hand there is every evidence that disease is yearly assuming alarming proportions, which may yet by its perpetuation seriously cripple the industry unless some timely remedy is applied. Various reasons may be assigned for this, but the main cause is the continual cropping of the land without rest, change or abatement, contrary to the laws of vegetation and nature.

The system of paying for cane by weight, irrespective of quality, has largely contributed to this position, and until payment by sugar content alone becomes universal no improvement need be looked for, except as already stated by a better method of cultivation and practical supervision, of which the system of paying by sugar contents must in time forcibly compel the adoption.

Some little while ago two meetings were held at the instigation of the influential sugar men in this neighborhood for the purpose of inviting Dr. Maxwell, of Honolulu, to the district, to inspect and advise what should be done in the field with a view of recuperating the cane crop. This is strong evidence that these gentlemen are quite alive to the urgent necessity of something being done, and it is to be hoped that their object will meet with success. If, however, Dr. Maxwell should not come at all, is the matter to be dropped and the ravages of disease allowed to continue? I confess to being somewhat sceptical of the success of Dr. Maxwell's visit since it would be only a flying one, as to do any real good it would be necessary that he should remain for some time to instruct and supervise. The idea seems to be to establish experimental stations each in charge of an expert, but if we take Mackay experimental station as an example of Queensland expert knowledge, the Dr. must procure men from Honolulu or elsewhere. Even then success may be doubted, as without a supervising head with all the experience and abilities of Dr. Maxwell, there is nothing to prevent the scheme failing. It is Dr. Maxwell that is believed in and that is wanted, at least for such a time as would enable him to successfully establish these stations and see that the experts who had been appointed to supervise them had the confidence of the growers and were thoroughly capable, and this I think is not at all likely to be attained and satisfactorily completed during a short visit.

Meanwhile, and in the direction indicated, a very decided improvement if not indeed a remedy for the disease may be obtained by taking advantage of or acting on the uniform term "fit for manufacture into sugar" contained in all cane agreements, whilst the additional term "proper cultivation," not uncommon in others, still farther strengthens the hands of the mill owners. These terms are unmistakable and have only one meaning and it seems strange that they are not in-

sisted upon in view of the disastrous results that are now being experienced. Not insisted upon in an arbitrary vexatious way, but in an amicable conciliatory spirit. Notwithstanding the terms of the agreement mentioned and which the growers have so long been, to their cost, gratuitously allowed to ignore, it is said that they would not permit of any kind of interference with their work. It is not, however, here suggested to interfere but to advise, and in such a way, armed with the results of their own efforts as will appear later, that so far from resenting they would welcome and appreciate any effort made to better their condition, since to them it means absolutely nothing else, and would cost them nothing. By this means the manufacturers and growers would come into closer contact with each other to the decided advantage of both, and it is this want of touch that is in a very great measure responsible for disease and crop failures now so common. There is no better proof of this than the fact that on large estates where growing and manufacturing are combined, they are by comparison fairly free from these evils, and where they do exist immediate steps are taken to prevent them spreading. This is at once incontestible proof of the value of being in close touch with the grower, and the reason simply lies in the fact that these combinations—their interests being identical—take more care in the selection of plants, and by their *system* of work naturally succeed in propagating a healthier cane than can be produced under other conditions.

If then the words of the agreement referring to cane fit for manufacture and proper cultivation are not utterly meaningless, let us see what should be done to give effect to them, not by interference but by observation and advice. The duties of a cane inspector, understood in the strictest sense, are highly onerous, as I shall proceed to show, and every mill owner and grower who may desire to run on more modern and economical lines will no doubt grasp the position. Every farmer who intends to grow cane for a mill should have his land and cultivation carefully inspected and described. Measurements should be made of each block cultivated, the variety of cane grown, its age and condition noted, and whether plants, replants, or ratoons; a description of the cultivation generally adopted ascertained, and if manured the quality and quantity applied per acre, how applied, and the prevailing weather when the work was done, the age also when the cane was cut

and the tonnage obtained per acre; the whole to be recorded for future reference. In taking the measurement of the land under cultivation in the first instance a rough sketch or plan of the farm should be made, and this in turn transferred to the mill sketch book. The original plan and measurement being made it would then be only necessary each slack season to note any changes, and correct the original accordingly; inspection to be made some time before cutting, and an estimate submitted of the probable yield for the season, and arrangements made generally for harvesting the crop. The economical distribution and handling of the tramway plant would also have attention. The accounts in connection with payment of cane would be seen to, and advances recommended on growing crop if necessary; strictly understood such are an inspector's duties, and it is obvious that if faithfully carried out in every detail, must of necessity keep the mill in close touch with the grower and his work, and prove a fund of valuable information at all times available to both.

But it may be said this is all mere data; how can this grow cane and better our position? It is from the want of data that areas of land are persistently cultivated and money lost; it is the want of data that prevents the grower from gaining that knowledge which instructs him as to the value of his work and protects his best interests, and it is the want of data that makes every grower think his own way of work superior and no two of the same opinion; and so it is the want of data that is largely responsible for the present unhealthy condition of cane and poor crops. No man would wilfully cultivate diseased cane, but with data to guide him he may avoid it, whilst without it he is groping in the dark. Moreover it is this conspicuous want of data that will much handicap Dr. Maxwell in preparing his report, and the only data that he can procure is the statistical information of the colony published annually, and which for his purpose is of little value since the subject is necessarily dealt with in a purely superficial manner. The C.S.R. Co., will be able to furnish detailed working data from their reports, but of what use is this to the Dr. to enable him to arrive at a general view of the whole question, when the C. S.R. Co.'s work is not and cannot be any criterion of the work done to the cane by all those engaged in the industry. To be able to make this statement without fear of contradiction is in itself strong evidence of the hap-hazard and irregular

method of work carried on which is responsible for the deplorable condition of the agricultural side of the industry at the present time. Then what data do the growers keep? None; and beyond the weight of cane taken for payment, there is absolutely no data of any kind, so that there is nothing to guide the growers as to the advantages or disadvantages of performing certain work at certain periods on certain blocks under certain conditions; information that if placed on record would save them money and unremunerative toil. Surely there are no growers so arrogant and independent that would deem it interference to have this information gratuitously provided them by the mill? Assuming then that all these conditions are fulfilled so as to enable the work to be carried out to the satisfaction of all concerned, we have yet to consider another important feature, not the least of those already dealt with.

It is well-known that the more expeditiously the cane is treated at the mill after being cut the better, as deterioration immediately sets in, yet the avoidable delay is as a rule far away in excess of what should be permitted. In the busy excitement of work when in full swing it is somewhat difficult to notice an excess of cut cane, and so long as the juice continues to work satisfactorily every one is satisfied. When, however, difficulties set in by treating bad juice, closer attention is paid; individual canes are pulled from the trucks and carrier, cut, sliced and examined, and it may be a magnifying glass applied to trace disease or gum if not visible to the naked eye, and the general opinion arrived at that the cane is diseased. The excess of cut cane, however, as probably contributing to the trouble, is never thought of, but let a serious breakdown take place and we have then at least part of the mischief revealed by discovering that there are four or five days cane cut ahead of the daily supply required, therefore we have every reason to presume that this is going on throughout the whole season. This may or may not be altogether the result of incompetency, but it bears certainly that complexion; however, it is unpardonable no matter what the reason may be, and there is a great deal of it. The loss caused by this excessive cutting is very serious not alone to the grower in weight by shrinkage of the cane while lying exposed in the field, but to the mill also in sugar to a much more alarming extent, to which must be added the cost of manufacture, aggravated by

the knowledge that it was preventible. All these irregularities and troubles are within the scope of a competent inspector to eliminate.

J. Y. B.

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CROSSMAN & BROS.' VIEWS ON THE COFFEE MARKET.

New York, October 31st, 1899.

Dear Sir,—The conditions which has led to the lower values of coffee in Brazil were primarily the high prices in the National currency there, which showed such an alluring profit to the planters that they increased the area under coffee cultivation to such an extent as to make a crop of 10,000,000 bags in Rio and Santos a natural result. Even this is not considered a *very* large crop under existing circumstances.

The high currency prices in Brazil were the natural result of the continued decline in the rate of sterling exchange there, commencing with the overthrow of Don Pedro in 1889, when the value of the Milreis was above 27 pence, while now it is only seven pence.

Over-production of coffee differs considerably from over-production or surplus of almost every other kind of staple. Outside speculators probably do not realize that while wheat, corn and cotton have to be planted every season, the coffee tree after the first four or five years bears fruit and continues to do so season after season for many years. They also do not realize that surplus coffee cannot be diverted into other channels of consumption, like corn and cotton are liable to when prices are very low. Even at very low prices, the consumption of coffee cannot be increased to anything like the extent of the present enormous production, and there is absolutely no way to improve values permanently, except by curtailment of production. This latter can be brought about in Brazil by doubling up the present sterling value of the Milreis and consequent relative reduction in the currency price. Now, in view of financial conditions in Brazil, when no tangible improvement has resulted from the three years' moratorium in the payment of their coupons, it is too much to expect that Brazilian finances can be improved sufficiently to double up the present sterling rate for the Milreis; the more so, as the entire element of planters and agriculturalists are stubbornly

opposed to an advance in the sterling rate. Therefore, a curtailment of production is now contingent upon constant lower prices for coffee in consuming countries until the same reach a basis that would force the Milreis value in Brazil down from its present range of about 40 Milreis per bag, to 30 Milreis or less per bag.

From experienced coffee merchants in Brazil we understand that a price of 30 Milreis or less, per bag, might seriously interfere with further cultivation and actually tend to a neglect of plantations now existing to an appreciable extent.

Unfortunately, for the achievement of such results, consuming markets have persistently encouraged Brazil to keep up the increased production of coffee by repeated efforts to raise values in the face of continued accumulations of stocks, lower rates of exchange and high Milreis prices for the coffee in Brazil. Every effort of this nature has postponed the possibility of reaching a sound market, or in other words getting down to a price where curtailment of production would naturally follow. Advances based upon anything else can be only temporary and ultimately cause more disaster and lower prices than would otherwise occur.

The world's visible supply of coffee on October 1st was 8,036,556 bags, as against the highest figures of the world's visible two years ago—November 1st, 1897, 6,246,999 bags (in a crop which turned out 10½ million bags in Rio and Santos). During that month of November the lowest figures were reached, and in Havre and Hamburg they were several francs and pfennigs, respectively, lower than they are today, notwithstanding that in the meantime an enormous addition has been made to the visible supply, and a very large increase taken place in the stocks in the interior (invisible supply); in addition to which a financial weakening has been in process among the coffee trade in all the seaports of Europe and the United States, which certainly has not tended to increase the carrying capacity.

Reports from Brazil are uniform in stating that the prospects of the next crop are as favourable as can possibly be expected, so far as the season has advanced.

To illustrate how great the desire is to create higher values for coffee, reasonably or otherwise, we need only to refer to the advance which was made in the coffee markets on Thursday last on the reports of the appearance of the Bubonic

plague at Santos. Only the wildest imagination could construe such a feature into a bull argument, as isolated cases of this disease have appeared in seaports elsewhere, without interfering with commence in the least, and certainly cannot cause any disturbance in the cultivation or movement of coffee in the interior. It may, however, add to the demoralization in exchange in Brazil, which is a decided bear argument. Such unhealthy speculative experiments like the one we refer to have been attempted, unfortunately, several times before, but they have always resulted in disastrous failures, rendering conditions finally so much weaker.

It has been claimed by Brazilian merchants that many large planters wish to continue raising large crops at low prices, as it is their desire to try and kill the competition of other coffee-growing countries and thus acquire a monopoly for Brazil coffee. This idea is entirely impracticable, as other countries will learn how to practice economy if Brazil can succeed on that principle.

We understand Brazilian planters are now raising their necessary cereals again, like corn, rice, beans, etc. This is truly the first step towards successfully raising large crops of coffee at low prices for the product.

Necessity is a good teacher to all mankind, and Brazilians have no monopoly of that experience. Planters in Venezuela, Central America, West Indies and elsewhere can learn and profit by it the same as Brazil, and in spite of continued talk of decreased plantations or smaller production of coffee in other countries than Brazil, the total exports from such countries last year were in excess of the previous season, notwithstanding the small crop in Java. While a shortage may occur in one section, district or country, there is a compensating increase elsewhere, so that the total of one year is as large as another, if not larger. Economic achievements of raising large crops at low prices have been well demonstrated in respect to sugar, cotton, corn, etc. Low prices resulting from over-production may remain more or less permanent, and Brazil as well as other coffee countries will learn the lesson to produce coffee at a price which heretofore has been considered unprofitable.

We can see no way out of present conditions, except by patiently waiting until the production shows signs of decrease

—until natural causes bring about a reduction of supplies, and from all appearances such results are a long way off.

W. H. CROSSMAN & BRO.

—*Madras Public Opinion.*

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THE YANKEE IN TROPICAL AGRICULTURE.

By Frederick V. Coville,
Chief Botanist of the Department of Agriculture.

N. Y. Independent.

Soon after the University of Chicago was established, a certain Eastern professor was invited to the new institution. Just before his final departure for Chicago, however, his colleagues gave him a farewell dinner, at which he described in glowing terms the new Western university, and declared to the mingled surprise and amusement of his hearers that in Chicago, more than in any other place he knew—and he had traveled widely—was to be found the real home of culture. During the friendly banter that followed this declaration one of his Eastern colleagues remarked, with a deeply-shaded twinkle, that judging by all precedents in the history of Chicago, her rapid growth, her world's fair, drainage canal, and other civic institutions, he had not the slightest doubt that when Chicago took up "culture" she would make it "hum." In this same spirit I feel safe in predicting that when the Yankee is firmly established in the tropics he will make tropical agriculture "hum." This should not be received as a piece of cock-sure Americanism, of which we hear too much, but rather as something amply demonstrated by some past experiences which I purpose to relate. It is not to be expected that agriculture in Porto Rico, for example, will rehabilitate itself in an immediate or spectacular manner, but that the new life and energy put into it will after a period of years show results of the most striking character. If this does not prove true all signs fail.

Improvement in tropical agriculture due to American activity will manifest itself in popularizing, bettering and cheapening tropical products. Probably no clearer example of the successful popularization of any group of agricultural pro-

ducts can be found than that recently achieved by the fruit growers of Southern California. A decade ago it began to be appreciated by Eastern men, who had been attracted to Southern California, that if its wonderful fruit-producing capacities were ever to become a source of large profit a market in the great centers of population must be secured. To secure that Eastern market it was necessary to make California fruit more attractive than that produced anywhere else. These California Yankees, therefore, deliberately and systematically set to work to accomplish this. They had much to contend with. California fruit had a bad reputation, because unscrupulous dealers had made inferior shipments. The growers held meetings and discussed the whole problem until all the influential men thoroughly understood how they must proceed. Associations were formed through which the growers became their own shippers. They devised new systems of packing by which the fruit was not only better preserved, but by its dainty appearance it attracted the attention of buyers. Transcontinental freight rates had been excessive. The growers asked the railroad companies for lower rates, backing their demand with substantial proof that unless it was met the development of the country would be stifled and the railroads themselves be the chief sufferers in consequence. Lower rates were granted. The accidental stalling of a freight train somewhere on the long journey it was found would cause such a delay as seriously to injure the fruit, causing loss to the growers and detracting from the good name of the California products. This uncertainty in the time of transit had also developed a practice of picking fruit in such an unduly immature stage that it never acquired the natural flavor. The fast refrigerator freight train was the remedy for this difficulty. It ran on a regular schedule, and carried a box of peaches to New York almost as fast as a passenger or a sack of mail by the regular trains. Finally, in some districts, a system of inspection has been perfected through which fruit that does not come up to the required standard cannot be shipped. The result of all these endeavors has been the marvelous expansion of the California fruit industry. Is there any reason why with good packing, cold storage, and swift steamers, the guava, the mango, the avocado, and a dozen other tropical

fruits should not be made as plentiful on our tables as the pineapple, the banana, and the California pear?

In the betterment of agricultural products in the United States the exercise of Yankee inventiveness has by no means been confined to machinery. Many thousands of new varieties of fruits and vegetables have been invented by our horticulturists and our agriculturists. As with machinery, these inventions are sometimes the result of accident or of ill-directed exertion, but oftener, especially in recent years, the achievements have been the result of trained investigation. The investigator sets out to produce a fruit of specified qualities, with a certain color and form, for instance, capable of withstanding a certain climate, of large productiveness of good flavor, of satisfactory packing qualities, and ripening at a particular time. He chooses suitable parent plants for cross-breeding, he brings the offspring to maturity, by hundreds or by thousands, discards the undesirable ones, and by a long process of careful selection, and when necessary by further cross-breeding, he finally turns out a fruit of the required characteristics, a new horticultural invention.

Thirty years ago the Florida orange was still unborn. During that period hundreds of varieties have been evolved on Florida soil, purely the result of intelligent American activity. A hundred of these at least have superior merit. In grapes we have developed in less than a century from a few wild American species, originally sour or musky, an almost endless series of delicious products. In a somewhat longer period we have given American apples a world-wide reputation, developing from a tree of Old World origin at least three thousand well established varieties. American strawberries are unmatched in Europe, and we are fast following with the blackberry, the dewberry, and the red plum.

However much shall be accomplished by Americans in popularizing and improving the agricultural products of the tropics, the most important effect of American activity will probably lie in the cheapening of these products. The application of machinery in agriculture, particularly the substitution of machine work for hand labor, is an art in which the American, as compared with the European, stands pre-eminent. According to Mulhall, the value of the agricultural pro

ducts per capita of the agricultural population in Europe in the year 1887 was $215, while for the United States it was $425. The efficiency of an agricultural laborer in the United States in other words, or his capacity for production, is double that of the agricultural laborer of Europe. This difference is undoubtedly due chiefly to the wider and more intelligent use of improved agricultural implements in America. The American laborer having achieved these results is ever on the alert for further improved machines and better methods of using them.

I recently visited a logging camp in the tide-land spruce region of the Oregon coast. This large tree furnishes saw-logs from four to eight feet in diameter. Logs of this size are hard to manage by the ox and skid-road employed in the pineries of Michigan and Wisconsin, and, curiously enough, on our way to the logging camp we passed an abandoned skid-road, overgrown with grass and briers. Instead, the machine that was hauling the logs out of the woods was a donkey-engine stationed on the bank of a small stream opposite the point where the trees were being felled. An endless wire cable extended across the stream a quarter of a mile into the great forest beyond. The loggers were felling an avenue of trees along this cable, cutting the trunks into saw-logs of suitable length, attaching them by enormous grips to the cable, and dragging them by sheer force through underbrush, rotten logs and stumps into the stream. It was rough, fast work, but it paid well. The ox and the skid-road had been passed by in the race.

In the manufacture of cane sugar probably the most important advance of recent years is due to an American invention. The sugary juice is extracted from the cane by passing the stems between heavy steel rollers, and the crushed refuse, known as bagasse, is used for fuel in the engines that run the sugar-mill machinery. Sugar-cane producers do not follow the so-called diffusion method of removing the sugar—essentially a leaching process— so generally adopted for the sugar beet, because the bagasse would be full of water and could not be used for fuel. But this refuse as it comes from the rollers is still moist, and before the invention of which I will speak it was the practice to cart it away to an adjacent field, dry it in the sun, and haul it back to the engines. This neces-

sitated the continued and expensive use of carts, mules and men. A system has now been devised by which the bagasse is taken directly from the rollers on a conveyor, or narrow moving platform, and dumped into a specially constructed fire-box, which is of large dimensions, furnished with an air blast, and so arranged that the bagasse becomes available for fuel at once, drying as it burns. By this system a large mill dispenses with two hundred men, their mules, wagons and tools, and substitutes this simple machinery with two men to look after it. The process, now in use on the large Cuban sugar estates has made an important reduction in the cost of manufacturing sugar. The high grade of efficiency of the sugar mills in the Hawaiian Islands and in Cuba is generally due to American industry and enterprise, and had its beginning on the sugar plantations of Louisiana.

Manufacturers and dealers in coffee machinery say that the American inventions in their line are confined to such machinery as is used in handling coffee after it reaches the country of consumption. This is significant, as is also the remark that from the condition in which coffee is received at our home ports there is evidently room for improvement in the coffee-cleaning machinery now used in the countries of production. It is interesting to note here that the Hon. James Wilson, the present Secretary of Agriculture, has made the prediction that before many years coffee will retail in the United States at ten cents a pound.

Rice is grown in the swamp lands of tropical or subtropical regions, and on account of the submerged character of the land the ripe grain must be reaped with a sickle. The cost of hand labor in the harvesting has been so great that rice-growing in the excellent rice lands of our Southern States has not been profitable and the United States has been importing rice and rice flour to the value of two to four million dollars annually. The Southern Pacific Railway, about 1880, opened up a peculiar prairie region in Southwestern Louisiana known as the Lake Charles District, which at that time was almost unused agriculturally. Some keen men, however, decided to attempt a new sort of rice cultivation. They built up ridges of earth about sections of the prairie, flooded these areas with water pumped up from wells, and planted rice. When the rice crop is about to mature the

water is drawn off and the land allowed to dry. A reaping machine is then put to work on the field, and the crop is harvested by machinery like other grain crops. The plowing, too, for the next year's sowing is done while the land is drained, and thus more effective preparation and fertilization of the ground is possible. The profits from this new method of cultivation have been eminently satisfactory, and unless unforeseen limitations arise all the rice used in the United States will be grown in this way.

An illustration of the opportunities in tropical agriculture is afforded by the vanilla plant. Early in the present century this was introduced into the Island of Bourbon. It grew luxuriantly but it produced no fruit, until it was discovered about 1840 that cross-pollination was a prerequisite to the development of pods, "beans." As soon as the practice of hand pollination was generally adopted vanilla cultivation rapidly increased, and now has assumed large importance in Mauritius, Bourbon, the Seychelles, and other islands about Madagascar. The present annual product of these islands has a value of about $1,000,000. The heavy item of expense is the cost of pollination. Each of the millions of flowers pollinated must be treated singly, by hand. The remarkable construction which appears to necessitate this hand pollination in the vanilla flower is in reality, as in most other orchids, merely an adaptation to cross pollination by insects. It is clear that the proper insects to accomplish this pollination do not exist in these islands, but, on the other hand, I do not find any record that the British or French Governments or any of their subjects have ever attempted to introduce such insects. I venture the prediction that if vanilla culture is taken up in Porto Rico on a commercial scale an insect, not a Porto Rican or American laborer, will ultimately do the pollinating, and that if an insect which can do the work does not now exist on that island, the Yankee will search the earth till he finds one.

In Java and other islands of the East Indies grows the mangosteen, which is pronounced by travelers the most delicious of all fruits. It is said that a standing offer of twenty pounds has been made to any sailor who succeeds in bringing fresh mangosteens to the English queen, and that the prize is still unclaimed. Is it too much to expect that the

best fruits of the Old World tropics will be transferred by American industry to the New World tropics, and that perhaps, with the aid of swift vessels and cold storage, it may yet be some Yankee farmer who will carry mangosteens to the Queen.

The single characteristic of American character which gives the highest promise of pushing modern civilization into the tropics is his home-building. The importance of this fundamental American trait must not be lost sight of by those who establish governmental systems in our new possessions, and more particularly is the recognition of this essential to the best agricultural progress. It is not to be expected that the American will take the place of the native laborer in tropical agriculture. It is far more likely that, keeping up his reputation as of Anglo-Saxon stock, the American will sit in the shade and watch the other man do the work. But whoever does the work, it must be done well. The American will hold himself in reserve, not because he is afraid to work, but because he must see that his men do the very best they are capable of doing. Where his plantation is there will be his home. He will escape the evil of absentee ownership. The United States, through the colonial regime, inherited their land system from Great Britain, and it was not until the nineteenth century was more than half gone that we had developed a distinctly American land system, as crystallized in the Homestead Act of 1862. This system differs in two fundamental respects from the British. Our public lands, corresponding to the crown lands of the Empire, are not maintained as a source of public revenue; the title is granted only in areas of limited size, and free of cost, but with rigid conditions as to residence and improvement. It astonishes an Englishman to learn that the United States has given away land worth thousands of millions of dollars. When the United States gives away a piece of land, however, it usually gains a settler; when the British Empire sells a piece of land it usually gains a landlord. As a result, in the British colonies there is a much higher percentage of absentee landowners, who, as a rule, live either in London or in the larger colonial cities. In New South Wales and other Australian colonies no class of legislation has been more extensive and important than that for relief from a land system inherited from the mother

country, which was wholly unsuited to the encouragement of immigration and permanent rural settlement.

To a sound land system the lawmakers of our insular possessions should add certain simple measures to give additional incentive to rural settlement. Decentralize the government as far as practicable. Extend municipal, county and other local systems as fully as the inhabitants are capable of assuming them. Teach the fundamental American principle of local self government as we have taught it to our immigrant Poles and Swedes. Let the districts be small enough so that a man can transact his legal and public business without making a long journey. If a planter must go to the capital city to vote, to record a deed, and to pay his taxes, he has a strong incentive to fix his home there, and to make his residence on his plantation only transient. To this practice of administrative centralization has been due the lack of rural settlement in many a tropical colony. For half a century New South Wales consisted of little more than a city walled in by a wilderness.

Washington, D. C.

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REVIEW OF THE SUGAR TRADE FOR 1899.

The International Sugar Journal of January contains its customary annual review of the sugar trade, which covers some eighteen pages. It refers to the speculative movement in sugars of the past year, which entailed heavy losses on most of those concerned in it. After referring to the changes that have been adopted in the sugar trade of England, it says:

"One feature which characterises our market at the close of the year must not be overlooked, as it is of considerable import for the coming year's operations. It is this, that notwithstanding the willingness of some German and Austrian factories to sell the new crop of 1900 (nearly twelve months ahead) at prices very little in advance of present rates, few—if any—purchasers are found. The clear deduction from this fact is that those best able to judge do not expect any great change in values during the year, though no doubt the advance in the bank rate has some share in the disinclination to speculate.

"The price for prompt beet, which in the first week of January, 1899, stood at about 9s. 6d., and at one time in June reached

11s. 6d., has now dropped to 9s. 2d. British West India brown, quoted at 10s. in January, 1899, now fetches about 9s. 6d.

"There can be no doubt that consumption is everywhere increasing, even though now and then the figures for the moment seem to show a decline in sales by producers and stock-holders or their agents and brokers. It would appear that, in view of the exceedingly cautious action of refiners and merchants, and of the comparative absence of speculation we can for the present quite dismiss the once frequently referred to "invisible stocks" as a factor in calculations. It is quite certain that the retailer or the small wholesale dealer will not be willing to lock up capital in storing a reserve of an article in the price of which he expects no fluctuations that can seriously interfere with profits, and so we may drop the idea of so-called "invisible stocks" affecting the markets.

"One of the most satisfactory and encouraging features of the sugar industry is the certainty that for a number of years a more or less progressive advance in the general consumption of the world may be confidently looked for. The figures of consumption per head of the great producing countries of Europe are simply ridiculous in face of the fact, so familiar in Great Britain and her colonies and in the United States, that sugar is no mere luxury, but a prime necessary of vigorous healthy life. The experience of the past year in Germany and France has convinced all thinking men that an enormous gain in muscular activity and capability of exertion, and in recuperative energy is to be derived from a liberal consumption of sugar. And so the two nations most directly interested in the maintenance of a large and thoroughly effective army are now, after careful experiment, making arrangements for a much larger supply than hitherto of this indispensable aliment to their soldiers. The extension of the greater consumption of sugar as food may hence be looked on as certain, for the people generally and their medical advisers will not be slow to profit by the great object lesson which the experiments in the German and French armies have afforded. To this powerful factor in the increase of consumption must be added the conviction, more and more growing in the minds of all concerned, that the key to the solution of the difficult bounty question is to be looked for in the direction of promoting the greater use of the article

by reducing the enormous duties which have so long stood in the way. * * *

Looking at the position of the beet sugar industry in general, we think it must be admitted that not only has no ground been lost, but that very definite progress has been made, and we see the cultivation of the beet rapidly extending in the United States, Italy, and Spain, being introduced with great prospects of success in Roumania, being attempted in Australia, Peru, Turkey and China, and being proposed in certain other quarters more or less adapted to the plant, such as Argentina, Chile, Mexico, and even once more in the United Kingdom, where very definite and continued experiments, fully reported on from time to time in our pages, have proved the possibility of its growth in a commercially remunerative form. The extraordinary scientific ability and experience which is now brought to bear upon the cultivation and manufacture of beet sugar in all its stages renders it a doubly formidable opponent to the cane wherever the climate favors the development of the plant, advantages of which its great rival is to a large extent (excepting in Java, Louisiana, and Hawaii, and partially the West Indies and Mauritius) poorly possessed as regards agriculture, and as regards manufacture, almost totally destitute. It is the chemist, the scientific agriculturist, and the chemical engineer who have proved the salvation of the beet industry and who are still leading it on to victory.

Cane sugar production, excepting in Java, Queensland, and perhaps Mauritius, does not seem to have made much, if any, advance, though it is only the unsettled state of matters in Cuba that stands in the way of an enormous development of production, which in the near future will completely change the conditions of supply as regards the largest sugar consuming nation of the world, and is the subject of anxious consideration both in the United States themselves and in the principal but producing countries of Europe. It may be remembered that we discussed rather thoroughly last year the question of the effect on the American home sugar industry, both cane and beet. The situation as regards the quantity of the beet sugar production in the United States has changed considerably, a rapid development having taken place, which would have been greater but for the drought in California, which development also appears likely to be continuous. This fact, however, only accentuates the danger to the American home industry from

the possible eventual inclusion of Cuba in the United States and the consequent admission of her sugars duty free. The allusions to Cuba and Porto Rico in the President's message are not very definite, but it would be tolerably safe to assume that Porto Rico sugars will come in on the same terms as those of Hawaii, whilst Cuban sugars will shortly receive at least equally favorable treatment with those of the West Indies, with whom reciprocity treaties, according a reduction of about 12½ per cent. in the duty on sugar, have lately been or are being concluded, though the power given to the President in such cases extends to the remission of 20 per cent. of the duty. It is not wise, perhaps, to indulge in prophecy where such powerful interests are concerned, and in connection with a country where money so eminently means political influence, but we think the conclusions of the two prominent authorities whom we last year quoted at length and summarized as follows will not be upset. We then wrote: "It will be seen that these two very capable authorities agree tolerably closely in considering that under the most favorable supposition with regard to the political and fiscal arrangements, the interests of the American sugar industry will suffer indirectly, but under the supposition of the establishment of a customs union with Cuba or the annexation of that island, they will receive a fatal blow. Also that anyway the importation of European beet sugar will practically cease." It appears to us that the cane sugar industry has the most to fear from the competition of the Cuban production, as the new beet sugar undertakings will receive, for a time at any rate, the energetic support of the States in which they have been set up, in the shape of State bounties, exemption from taxation, &c. * * *

As regards Europe, the factories in Germany, now the largest sugar producing country in the world, have probably done very well this year, as will be seen from a list of the results obtained by them in 1898-99 given in another part of the present number. The losses this last season have been very few, and mostly unimportant, as compared with those recorded previously, and in some cases the profits have been phenomenal, and calculated to awaken a feeling of envy in the minds of many of the unfortunate West India planters, who do not enjoy the advantages of almost unlimited capital and the best scientific assistance both in cultivation and in manufacture, especially the latter.

"The great event of the year in connection with the sugar trade in the United States has been the obstinate competition between the American Sugar Refining Company and the independent refineries. It has gone on with increasing pertinacity during the whole of the year under review, and notwithstanding occasional rumors of a compromise, which have lately been revived with some probability—possibly because people thought it time that such apparently needless competition should cease,—there is really no sign of a settlement having been effected or being near at hand. Twelve months ago we remarked that the struggle might last for one, two, or even three years, but that a settlement such as that which terminated a former similar contest, i. e., the absorption of the independent refineries by the so-called "Trust," was hardly so probable in the present case. The great commercial combinations known as "Trusts," are certainly from an abstract point of view illegal in the United States, and the last Presidential message not only indicates in detail certain points connected with the present state of things, but distinctly characterizes these organizations as evil, and suggests immediate action by Congress. In conformity with this suggestion a Bill has been introduced into the Senate with the object of the suppression of trusts. We do not anticipate any danger to the "Trusts" from this or from any action likely to be taken by the President or his party, and we look forward with tolerable certainty to once more discussing, if necessary, the action of the American Sugar Refining Company twelve months hence. It would be expecting too much to suppose that a President who largely owes his position to great capitalists and their combinations would do anything really calculated to injure such good friends. As regards the American Sugar Refining Company in particular, we have before now expressed our opinion that its action has been decidedly to the advantage of the American nation. The astute manner in which the various sources of supply have been played off against one another so as to secure every advantage in the purchase of the raw material, and the way in which the various producing countries and the general market have been completely controlled, so that the "Sugar Trust" has always been independent of any one of then, is really an admirable piece of commercial statesmanship, and this salutary action has in no way been departed from or interfered with by the

American refiners during the existence of the present "refiners' war." The "Trust" is variously stated as supplying three-fourths and four-fifths of the total production of refined sugar. A new refinery, which is to be the third largest in the United States, is expected to be ready early this year. It is being erected by the Pennsylvania Sugar Refining Company, and a new process of clarification, a combination of electrolysis with the use of ozone, from which great things are expected (?), is to be tried. The Gramercy Sugar Company, of Louisiana, which has hitherto worked as a central factory of raw sugar, is adding a refining plant with bone-black clarification, and will deliver standard refined sugar. This is somewhat of a new departure, and the example, if successful, as there seems every reason to expect, will probably be followed by other large undertakings at present producing only raw cane sugar.

During the past year practically the whole of the Java sugar has been diverted to the United States; the whole of the Cuban and Hawaiian, most of the Porto Rico, and a large proportion of the West Indian production has also been taken by the American refiners. Egypt has also been heavily drawn on, while less European beet sugar than heretofore has found its way to New York and Philadelphia. A new feature is the production of raw refining sugars by the American beet factories, and this will probably extend, the temptation to supply the whole of their production to one large and safe customer, in preference to catering for local consumers and taking commercial risks, is considerable. The extension of the beet cultivation and manufacture, as already remarked, continues, and there is every probability of this becoming a constant and marked feature in American agriculture and industry. The troubles, losses, failures, and want of immediate success, which inevitably attend the introduction of a new industry, have been considerably fewer than might reasonably have been expected, and we may be sure that the beet sugar industry "has come to stay." Large quantities of land suitable for beet cultivation have been taken up in some States, especially California. The production of 1898-99 is stated to have been 32,000 long tons, that of next season is expected to be 95,000 tons. According to the Louisiana Planter, an unquestionable authority on such matters, the campaign of 1899 will go down

to history as one of the shortest in point of duration in the annals of the Louisiana sugar industry. A large quantity of cane was so severely damaged by frost last year that many planters have preferred to reserve a considerable proportion of their crop for seed or plant cane. The production is estimated at not more than 150,000 long tons, but with favourable conditions of weather, we may look for an unusually large crop in the coming year, owing to the fact just stated, that the estate proprietors intend to plant more extensively than usual. The total consumption of sugar in the United States is at the present moment probably not short of 2,000,000 tons.

The position of Cuba during the past twelve months, and even still more the immediate future of matters, is somewhat difficult to lay down. The final figures just received show that the last crop was somewhat ahead of that of 1897-98, but we look with considerable doubt on the estimates current in some quarters pointing to a possible crop of 600,000 tons for the season now commenced, and the estimate of Willett and Gray, viz., 440,000 tons, is much more probable. Owing to low prices, some estates will use their cane for planting, and the area of cultivation for 1900-1 will thus be extended. Continued drought this autumn injured the young canes, and the subsequent rains came too late to do much good. The sugar produced is almost exclusively "centrifugals."

The disastrous effect of the long-continued insurrection, and the further disorganization caused by the Hispano-American War, cannot, of course, be repaired in one season. The financial difficulties are the most serious point, and are not easy to overcome. We are told, on good authority, that the Spanish mortgages on the estates amount to nearly £4,000,000, and will fall due in April, 1901; meanwhile, Americans seem to hesitate, so long as the fiscal relations of Cuba towards the United States are uncertain and the legal positions remain undefined, to invest their capital. President McKinley's message would appear to hint at the probability of Cuban sugars being at least placed on an equally good footing with the West Indian product. Undoubtedly a strong and united effort will be made by those interested in the Cuban sugar industry to obtain free admission into the United States for its produce. This will, of course, meet with stout opposition from the American home sugar producers, and as the abolition of the duty

would mean a loss of $25,000,000 to the Treasury, the Government will not be very ready to move. It seems to us that the determining factor in the question is the attitude of the great refining interest, which up to now has shown itself fully capable of controlling the eventual course of these fiscal matters where sugar is concerned. Willett and Gray estimate that since the war about $1,500,000 have been invested in the Cuban factories and estates. Labor is now more easily procurable than just after the war, but is wretchedly paid. Arrangements have been made by the United States authorities for the importation of a quantity of drought-cattle. The rehabiliation of the old estates goes on but slowly, and we hear of only two new factories on the south side of the island, and of one on the north. The latter is to be on a very large scale, and will be close to the coast.

The Hawaiian Islands, according to official figures just lately published, produced, in the twelve months ending September 30th, 1899, 252,506 tons of sugar, against 204,133 tons in the preceding season. At the time of the annexation of these islands to the United States much apprehension was expressed as to the probability of a very large increase in the output. There has been undoubtedly a great deal of excitement and the promotion of new undertakings has been carried to an extreme, but there are certain difficulties in the way of an immediate large extension of the output, connected with finance, irrigation, and more than all with the labor question. This latter problem of labor still remains unsolved. All the same, it is an undoubted fact that both cultivation and manufacture are carried to a very high point, and a large yield and a better extraction of sugar are obtained than anywhere else in the world. The best and newest machinery, steam plows, chemical control of the mills and analysis of soils, &c., with the services of a most ably conducted experiment station and laboratory, place the planters in the best possible position and ensure steady financial success. Most of the land fit for growing cane is said to be taken up.

In Canada an attempt was made to obtain a re-imposition of premiums on home-grown beets, but the Minister of Agriculture held out no hopes of the question being considered at an early date. This is scarcely to be wondered at in view of the poor results that were obtained under the former regime.

There is little doubt that the climate is hopelessly against the cultivation of proper sugar beets. The refining industry is being somewhat unfavorably affected by the competition of American sugar, which bids fair to replace the refined sugar formerly imported from Great Britain. The Canadian refiners will probably be able to hold their own, in spite of the insignificant protective duty. Up to now, the chief purveyors of raw material have been Germany and Belgium.

In the West Indies and Demerara the past year has not on the whole been good as regards the output. Much of the sugar now being manufactured is a low quality for refining purposes, sent to the United States, where, if too good, it pays a heavier duty. This diversion of produce that used formerly to come to this country, will be favored by the reduction of duty under the new reciprocity treaties, if these are approved by Congress. Some progress is being made with the central question, and experiments carefully pursued for so many years in both West Indies and Demerara are apparently resulting in the obtaining of extraordinary rich canes. If these varieties are found to be permanent there would seem to be good hopes yet for the hardly pressed planters, handicapped as they are by the evil bounty system. Porto Rico has been heavily visited by a hurricane, which will somewhat reduce its production, the damage done to the sugar houses will result in the introduction of the central factory system in at least one case. The establishment of an Imperial Department of Agriculture with Barbados as its chief coffee, under the able superintendence of Dr. Morris, should be noted. The sugar production in Jamaica still continues small, and we hear no more of the proposed erection of a large central factory in Westmoreland, which in the early part of the year appeared to offer good prospects.

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